Contribution ID: **85** Type: **Contributed Talk**

Measurement of dielectrons in pp, p–Pb and Pb–Pb collisions with ALICE at the LHC

Thursday 30 June 2016 12:00 (20 minutes)

Dielectrons are a unique tool to probe several stages of the space-time evolution of the hot and dense system created in ultra-relativistic heavy-ion collisions. They carry unaffected information since once produced they escape the medium with negligible final-state interaction. The low-mass region of the dielectron spectrum (m $< m_\rho$) is interesting to study virtual direct photons with particular focus on its thermal component. This can provide a measurement of the system temperature complementary to that obtained by real direct photons. Low-mass dielectrons allow also the study of in-medium modifications of low-mass vector meson spectral functions. These modifications are connected to the partial chiral symmetry restoration, which is expected in a high temperature and energy density medium. Dielectrons are also sensitive to heavy-flavor production, which gives the largest contribution to the intermediate mass region of the dielectron spectrum ($m_\phi <$ m $< m_{J/\psi}$).

ALICE is the detector at the LHC dedicated to the study of heavy-ion collisions. Its excellent tracking and particle identification capabilities make this experiment well suited for dielectron measurements. Electrons are reconstructed in the ALICE central barrel using the Inner Tracking System (ITS) and the Time Projection Chamber (TPC). These detectors are also used for the particle identification together with the Time-Of-Flight detector (TOF).

We present the results of the dielectron measurement for Run 1 in pp collisions at $\sqrt{s}$ = 7 TeV, in p–Pb collisions at $\sqrt{s_{\rm NN}}$ = 5.02 TeV, and the current status of the dielectron measurement in central (0-10%) and semi-central (20-50%) Pb-Pb collisions at $\sqrt{s_{\rm NN}}$ = 2.76 TeV in ALICE.
We discuss also the future perspectives for the dielectron measurement and the predicted scenario after the ITS and TPC upgrades.

On behalf of collaboration:

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Session Classification: Particle Production